when light is transmitted, and in greatest quantity in the brightest areas. Thus a positive in starch is produced which can be developed by suitable treatment with iodine. [A leaf was then developed, and handed round to the audience for inspection.] The author showed that it might be possible to obtain a permanent print by suitable washing and treatment with a soluble silver salt, silver iodide being formed. The author regards this discovery as a most striking illustration of the way in which plants are working for themselves, and so for all living things, and points out that the extraordinary manner in which the green parts of plants (so to speak) catch the radiant energy of the sun, and employ it for analytical and synthetical chemical processes, may be easily and clearly demonstrated.

NOTES.

WE understand that the late Mr. John Ball, F.R.S., has bequeathed his botanical library and herbarium to Sir Joseph Hooker, to the Director of the Royal Botanic Gardens at Kew for the time being, and to the President of the Royal Society for the time being, requesting them to give the same to such person or persons or public institution in this country, the British colonies, or elsewhere in the world, as they or any two of them may select, with the sole object of promoting the knowledge of natural science. Right is, however, reserved for Kew to select previously such specimens or books as it may want.

THE following is the list of names recommended by the President and Council of the Royal Society for election into the Council for the year 1890, at the forthcoming anniversary meeting on the 30th inst.:—President: Sir George Gabriel Stokes, Bart. Treasurer: Dr. John Evans. Secretaries: Prof. Michael Foster, the Lord Rayleigh. Foreign Secretary: Dr. Archibald Geikie. Other Members of the Council: Prof. Henry Edward Armstrong, Prof. William Edward Ayrton, Charles Baron Clarke, Prof. W. Boyd Dawkins, Dr. Edward Emanuel Klein, Prof. E. Ray Lankester, Dr. Hugo Müller, Prof. Alfred Newton, Captain Andrew Noble, C.B., Rev. Stephen Joseph Perry, Sir Henry E. Roscoe, Dr. Edward John Routh, William Scovell Savory, Prof. Joseph John Thomson, Prof. Alexander William Williamson, Colonel Sir Charles William Wilson, R.E.

IN the list of Englishmen decorated in connection with the British Section of the Paris Exhibition, the names of the following men of science are included:—Grand Officer of the Legion of Honour: Sir William Thomson, F.R.S. Officers of the Legion of Honour: Sir Douglas Galton, K.C.B., Sir Henry Roscoe, M.P., F.R.S., Mr. W. H. Preece, F.R.S. Chevaliers of the Legion of Honour: Prof. Francis Elgar, Prof. W. Roberts-Austen, F.R.S., Dr. C. Le Neve Foster. Officer of Public Instruction: Mr. C. V. Boys, F.R.S.

THE Naturforschende Gesellschaft at Emden is to celebrate its seventy-fifth anniversary on December 29 next. The Society was founded in 1814 by twenty-four burgesses of Emden. The festivities in December will consist of a general meeting of the Society and the Society's correspondents at noon in the Museum, and a *Festessen* at four o'clock.

A REPORT of the proceedings of the International Zoological Congress, held in Paris two months ago, will be published shortly.

A FRENCH translation of Dr. Wallace's "Darwinism" will be published next year.

THE greater part of the ethnographical collection sent to the Paris Exhibition is to remain in Paris, in the Colonial Museum.

THE following botanical appointments are announced:—The Directorship of the Botanic Garden at Berlin, vacant by the death of Dr. Eichler, having been conferred on Prof. Engler, of Breslau, Prof. Urban becomes Second Director of the Berlin Botanic Garden; and Prof. Prantl, of Aschaffenburg, succeeds Prof. Engler as Director of the Botanic Garden at Breslau. Prof. Sadebeck, of Hamburg, is appointed Director of the Botanic Garden in that town, in the place of the late Dr. Reichenbach. Dr. G. von Lagerheim vacates the Professorship at Lisbon, to which he was lately appointed, and goes to Ecuador as Professor of Botany and Director of the Botanic Garden at Quito. Dr. H. Molisch, of Vienna, takes the Chair of the late Dr. Leitgeb in the Polytechnic at Gratz. Dr. F. Hueppe is appointed Professor of Bacteriology at the University of Prague, and is succeeded in the same Chair at Wiesbaden by Dr. G. Frank, of Berlin. The venerable Professor von Naegeli retires from the Directorship of the Botanic Garden at Munich. Mr. F. S. Earle, Prof. E. S. Goff, and Prof. L. R. Taft have been appointed special agents in the Section of Vegetable Pathology of the United States Department of Agriculture. Mr. H. H. Rusby has been appointed Professor of Botany and Materia Medica in the New York College of Pharmacy.

THE Economic Museum, Calcutta, has completed and despatched the first instalment of important Indian fibres required by the India Office for presentation to the Museums of the Royal Botanical Gardens at Kew and Edinburgh, and to the Chambers of Commerce at Dundee and Manchester.

A PRIZE of about £20 is offered by the Geographical Societies of Dresden and Leipzig, for "a physico-geographical description of the course of the Elbe between Bodenbach and its entrance on the flat country, with special reference to depth, quantity of water and its variations, ice, and changes in the form of the banks." The date is the end of 1890.

IN his address at the opening of the winter session of the University of Toronto, Sir Daniel Wilson, the President of the University, referred to the recent Toronto meeting of the American Association for the Advancement of Science. "Everything available for the special requirements of the Association," he said, "was placed at the disposal of the Sections; and we are gratified by the assurance that, at the close of a highly successful meeting, our visitors carried away with them pleasant memories of their reception here." The meeting of the representatives of science in the buildings of the Toronto University was in some respects, as the President pointed out, peculiarly opportune. "The long-felt need of adequately furnished and equipped laboratories and lecture-rooms for our scientific staff was anew brought into prominence by the restoration to the University of its Medical Faculty; and we now enter on the work of another year provided with buildings admirably adapted for biological and physiological study and research. Plans, moreover, have been approved of, which, when carried out to their full extent, will furnish equally satisfactory accommodation for the departments of botany, chemistry, geology, and palæontology, along with laboratories, work-rooms, museum, and other requisites for efficient instruction in the various branches of science."

THE thirty-fourth general meeting of the Society for Psychical Research was held on Friday afternoon, October 25, at the Westminster Town Hall. The President (Prof. Sidgwick) gave an account of the International Congress of Experimental Psychology held in Paris last August. The Congress had adopted the scheme of a census of hallucinations, already set on foot by the Society for Psychical Research in England, France, and the United States, and it was hoped that the collection of statistics might gradually be extended to other European countries. Much matter valuable to psychologists was thus being collected; and he trusted that fresh light would be thrown on the subject of coincidental or veridical hallucinations, which specially interested their Society. He would be glad to supply information in reply to letters addressed to him at Hill Side, Cambridge. A paper on recent telepathic experiences was also read.

WE learn from *Humboldt* that the project of a lacustrine biological station on Lake Plön, in East Holstein, is likely to be soon carried out, thanks to the energy of Dr. Otto Zacharias, and the liberality of the Bohemian Baron Bela Dertcheni. This station is to afford Prof. Anton Fritsch, of Prague, and his assistants, constant opportunities of research on fresh-water fauna. The scheme finds a good deal of favour in Berlin, and it is hoped that the researches at the station may prove of considerable benefit to fisheries.

WE send to America some return for the Colorado beetle and the Canadian water-weed. The "weed-law" of the State of Wisconsin requires from farmers, under penalties, the destruction of the following weeds:—*Cnicus arvensis*, *Arctium Lappa*, *Chrysanthemum Leucanthemum*, *Sonchus arvensis*, *Xanthium strumarium*, *Linaria vulgaris*, and *Rumex crispus*. Only one of these is a native of the United States; all the rest being naturalized importations from Europe, and common wild plants in this country.

PROF. RIGHI showed, last year, that ultra-violet radiations reduce to the same potential two conductors, a plate and a piece of netting, applied to each other, the rays being thrown on the netting-side. He now points out (*Riv. Sci. Ind.*, July–August) that this suggests a very simple and convenient way of measuring differences of potential of contact. One notes the deflection of an electrometer connected with the plate (the netting being permanently connected with earth); then, having connected the electrometer for an instant with earth, makes the radiations act a sufficient time. He used a zinc electric lamp, and the metals examined were placed in some cases in a bell jar, to which some gas or vapour was admitted. From measurements of different plates with the same metallic net (copper, zinc, or platinum), the differences of potential of pairs of metals could be deduced. Prof. Righi found the differences sensibly the same in dry and moist air and in carbonic anhydride; but with hydrogen, very different values (from those in air) appeared, where one of the metals examined was platinum, palladium, nickel, or iron (doubtless owing to absorption). In ammonia all the metals, examined with zinc net, seemed to have become less oxidizable; and in coal gas, carbon and platinum behaved like more oxidizable metals. A memoir on the subject will shortly appear.

IN an interesting paper on the management of aquaria, printed in the Bulletin of the United States Fish Commission, Mr. W. P. Seal points out that, in the feeding of the fish, care must be taken to introduce no more food than they can eat in a short time, as what is not eaten will soon decompose and make the water cloudy, and generate noxious gases as well. If due care is observed in regard to quantity, it does not matter how often fish are fed, except that if fed abundantly they will grow rapidly, which is not generally desired. Fish may be fed every day, or but two or three times a week, with equally good results apparently. They will always find a small amount of food in the aquarium in the vegetation. Where they are not fed sufficiently, they are apt to strip the plants of their leaves. In a natural condition fish are feeding continually and grow very rapidly.

ON November 2 a slight shock of earthquake was felt in St. Louis, U.S.A., and the vicinity.

THE following summary of the phases of Vesuvius during the past year has been supplied by Prof. Palmieri, of the Vesuvian Observatory of the University of Naples, to the British Consul there, and is appended by the latter to his last Report. Mount Vesuvius, during the past year, has continued its moderately eruptive activity, which began in the month of December 1875. There were various emissions of small lava streams, which did not reach further than the base of the cone. An additional cone was gradually formed, caused by the activity of the motive power of the crater which, towards the end of the year, had reached a height of 100 metres (equal to 328 feet) above its original level. On various occasions the detonations and the red-hot projectiles thrown up with the large quantities of smoke indicated greater eruptive power. During the whole year no ashes were thrown up, and consequently the crops in the surrounding country were not destroyed. The sublimations on the smoke issues were relatively scarce, and did not present any product that called for attention. The seismographic instruments at the Observatory did not show an activity proportionate to that of the volcano. All the lava streams that issued during the year flowed towards the eastern slopes of the mountain.

THE Meteorological Council have published Part I. of the Quarterly Weather Report for 1880. The work is (as before) divided into three sections: (1) a general summary of the chief features of the weather for the quarter; (2) tables showing the movements and peculiarities of the principal cyclonic and anti-cyclonic systems; and (3) remarks on the distribution of the various elements for each month, illustrated by charts. An appendix contains tables and diagrams illustrating the diurnal range of the barometer in Great Britain and Ireland during the years 1876–80, by F. C. Bayard. The data used are the hourly observations at seven Observatories in connection with the Meteorological Office, and at Greenwich and Liverpool Observatories. The paper shows that, even in these high latitudes, the daily range is well marked during all months, notwithstanding the interference caused by non-periodic changes. Important seasonal differences are shown, the morning maximum being distinctly higher than the evening maximum in winter, while in summer the evening maximum is the higher of the two. The values exhibit the influence of locality on the amplitude and epoch of the diurnal inequalities, and furnish material for more minute inquiry.

IT is interesting to read of a part of the world where the buffalo is not dying out, but increasing in numbers. A journal of Perth, in Western Australia, says that few Australians are aware that certain parts of Northern Australia have vast herds of the wild buffalo (*Bos bubalus*) careering over its plains and wallowing in its shady pools. The *Sydney Mail* states that the animals are massive and heavy, with splendid horns, and afford sport of a sufficiently dangerous nature to possess charms for the most daring hunter, a wounded buffalo being one of the most dangerous animals known, his great weight, prominent horns, and splendid courage, making him as well respected as sought after. The first buffaloes were landed at Port Essington, North Australia, about the year 1829.

THE *Naturalist's Gazette* has issued an excellent series of what it calls "label lists." On one sheet there is a list of British birds' eggs; on another, a list of dragon-flies; on another, a list of British butterflies; and so on. The names are printed in suitable type on gummed paper, and collectors, in labelling their specimens, will find the lists of considerable service.

THE next volume of Messrs. Ward, Lock, and Co.'s "Minerva Library of Famous Books" will be "Travels on the Amazon and Rio Negro," by Dr. Alfred Russel Wallace.

F. A. BROCKHAUS, 16 Querstrasse, Leipzig, has issued a catalogue, in four parts, containing lists of works relating to various branches of botany.

THE *Colonies and India* states that a discovery has recently been made on a Fiji plantation, which will probably prove extremely valuable in all tropical countries where the cultivation of bananas is regarded as a settled industry. The banana disease had for some time been causing much havoc on a plantation on Vanua Levu, and it appears that the discovery of an antidote was due to an accidental occurrence. On a flat near the seashore there was a patch of bananas much diseased, and some time ago the sea swept into it and remained on it for about an hour. All the plants were killed as far as the standing stems were concerned, but vigorous young shoots came up freely from the roots, and were not only quite free from disease, but soon began to bear much larger bunches of fruit than the parent plants ever did. Upon noting this effect the planters determined to try the experiment upon a number of badly diseased plants which the sea had not reached. They cut down the diseased plants, and, having stirred the ground about them, poured from one to four buckets of sea-water over each. The result was that, while the parent stems withered, vigorous young shoots came freely away, without a sign of disease.

A SERIES of successful experiments upon the simultaneous production of pure crystals of sodium carbonate and chlorine gas from common salt are described by Dr. Hempel in the current number of the *Berichte*. The experiments simply consisted in passing a current of carbon dioxide gas through a solution of salt contained in a special form of electrolytic cell, through which an electric current from a few Bunsen's cells or a small dynamo was circulated. The kathode found most convenient consisted of a plate of iron or carbon perforated with numerous holes about 4 millimetres in diameter, bored obliquely, so that bubbles of gas could readily escape upwards. For anode a similar plate of thin perforated carbon was employed. Both electrodes were circular in shape, and between them was placed a diaphragm of thick asbestos paper, which was directly squeezed between the two plates. This arrangement was found to possess the double advantage of bringing the two electrodes within 1 millimetre of each other, and so greatly diminishing the internal resistance, and of affording such excellent support to the asbestos diaphragm that any rupture of the latter was entirely prevented. The electrodes and their enclosed diaphragm were supported in a circular glass cell in such a manner that they divided the cell into two distinct chambers. To the glass wall of the cell on the positive or anode side was fitted a wide side tube, through which the salt was supplied as often as necessary in solid pieces, a little water being also from time to time added to replace that taken up in the crystallization of the sodium carbonate. A delivery tube was also attached to the upper portion of the anode chamber in order to conduct away the liberated chlorine gas. The negative or kathode chamber was supplied at its upper end with an opening serving on the one hand to introduce the carbon dioxide delivery tube, and on the other to extract the crystals of sodium carbonate. The apparatus was thus found to work continuously for weeks together, the asbestos diaphragm withstanding the pressure very satisfactorily. The separation of the soda crystals is readily explained by the well-known fact of the difficult solubility of sodium carbonate in solutions of sodium chloride; as fast as the electric current decomposes the sodium chloride into chlorine and sodium, the carbon dioxide converts the sodium hydrate formed by the reaction of the sodium upon water into the normal carbonate, which, in presence of the constantly replenished common salt, at once separates in the usual monoclinic form of $Na_2CO_3 . 10H_2O$. The total resistance of the cell is only about five and a half volts, which may be still further reduced by constructing both electrodes of carbon. Using a small dynamo-electric machine, 64·5 grams of chlorine and 259·8 grams of $Na_2CO_3 . 10H_2O$ per horse-power of 680 volt-amperes were produced per hour, so that the experiments, in addition to their interest from a purely chemical point of view, may turn out to bear fruit technically. The soda produced is stated to be chemically pure, and the chlorine to contain but a very small admixture with other gases.

THE additions to the Zoological Society's Gardens during the past week include a Patas Monkey (*Cercopithecus patas* ♂) from West Africa, presented by the Rev. James Vernall; a Cheetah (*Cynælurus jubatus* ♂) from South Africa, presented by Captain M. P. Webster, s.s. *Roslin Castle;* a Ring-tailed Coati (*Nasua rufa* ♀) from South America, presented by Mr. J. A. Martin; two Short-toed Larks (*Calandrella brachydactyla*) from Devonshire, presented by Commander W. N. Latham, R.N., F.Z.S.; a Sharp-nosed Crocodile (*Crocodilus acutus*) from Jamaica, presented by the Jamaica Institute; two Tuatera Lizards (*Sphenodon punctatus*) from New Zealand, presented by Rear-Admiral Henry Fairfax, R.N., C.B., F.Z.S.; a Smooth-headed Capuchin (*Cebus monachus* ♂) from Brazil, deposited; a Collared Peccary (*Dicotyles tajaçu* ♀), four Rosy-billed Ducks (*Metopiana peposaca* ♂ ♂ ♀ ♀) from South America; two Grey Squirrels (*Sciurus cinereus*) from North America; four —— Finches (*Munia nana*) from Madagascar, purchased.

OUR ASTRONOMICAL COLUMN.

STELLAR PARALLAX BY MEANS OF PHOTOGRAPHY.—Prof. Pritchard has sent us his eminently successful "Researches in Stellar Parallax" by the aid of photography, from observations made at the Oxford University Observatory. The advantage in point of convenience and rapidity in the multiplication of observations which this method possesses over all others is incalculable, and it is interesting to note that in the case of 61_1 Cygni the parallax obtained was 0″·4294 ± 0″·0162, and that Bessel's probable error is practically identical with this here stated. Hence, as far as the present results are concerned, photographic and heliometric measures of parallax may be regarded as possessing an equality of accuracy.

The following list contains the stars whose parallax has been determined by this novel method, and some of the results obtained :—

	″	″
61_1 Cygni	+ 0·429	± 0·016
61_2 ,,	+ 0·432	± 0·019
μ Cassiopeiæ	+ 0·021	± 0·023
Polaris	+ 0·052	± 0·011
α Cassiopeiæ	+ 0·035	± 0·024
β ,,	+ 0·157	± 0·036
γ ,,	− 0·032	± 0·026
α Cephei	+ 0·073	± 0·031

The almost identical parallax of the two components of 61 Cygni is worthy of note. The average of eight determinations gives a value 0″·437, which is a close approximation to Dr. Belopolsky's value of 0·50 as the *absolute* parallax of 61 Cygni.

Bessel determined a small negative parallax for μ Cassiopeiæ, but Dr. Struve assigned it a value + 0″·342. The very small positive parallax given by Prof. Pritchard may be explanatory of Bessel's negative determination.

The small negative parallax found for γ Cassiopeiæ would indicate that it and the comparison stars are in the same group, although its bright line spectrum points to a constitution different from that of other stars in this constellation.

Even a cursory examination of the summary of results renders it evident that no relation exists between the lustre and parallax of stars, and indeed, since we probably view bodies which are still in various stages of condensation, we should hardly expect to find any such relation.

MEASUREMENTS OF DOUBLE STARS.—*Astronomische Nachrichten*, Nos. 2929–30, contain a series of double star observations made with the 36-inch refractor of the Lick Observatory by Mr. S. W. Burnham. The discovery is claimed of two very faint stars in the trapezium of Orion, and an excessively faint double has also been detected by Mr. E. E. Barnard just outside and preceding the trapezium. The observers believe that, in spite of the numerous alleged discoveries of faint stars in this